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SHORTCOMINGS OF ARTIFICIAL FERTILIZER PRODUCTION IN HUNGARY

Mano Klein

Shortcomings connected with the preparation of natural fertilizer in Hungary have been disclosed by technical writers who have established that the supply of natural fertilizer is insufficient for four-cycle crop rotation, and that fertilizer is so poor that it is only 25 percent effective in the soil.

This disclosure comes at a time when extensive cultivation is under way, and the amount of hay, feed, and fodder available is sufficient for the livestock. The trend in agriculture is to step up production of industrial crops. To convert Hungary into an industrial country with a well-developed agriculture, the seasonal nature of crop cultivation is being eliminated, and industrial crops are encouraged, with more flax, hemp, cotton, rubber plants, and sugar beets produced, instead of increasing grain crop production. Some straw and cornstalk used for fodder will be diverted to the production of cellulose.

Hungary needs to improve the quality of her artificial fertilizers. It is generally low at present. Also, it is necessary to produce fertilizers more cheaply than has been the case so far.

At present, a 17-percent water-soluble superphosphate is being manufactured in Hungary. Since the cultivation of sugar beets requires 25-35 kilograms of phosphoric acid per cadastral yoke, 150-200 kilograms of this quality superphosphate must be applied before the beets are planted.

Pryanishnikov, the renowned professor of chemistry of the Moscow Agricultural Academy imeni K. A. Timiryazev, developed, after long experimentation, a double superphosphate containing 45 percent phosphoric acid. Factories throughout the world produced the new fertilizer on a large scale, though experimentation with the new fertilizer had not begun in Hungary. Hungarian fertilizer plants could not have solved the problems of producing the fertilizer without the benefit of Soviet experience and the work of Soviet researchers, such as Kolshekov and Kosakov, professors of chemistry at the Moscow State University imeni M. V. Lomonosov.

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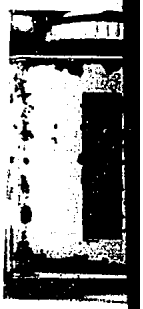

Today, the way is clear for the construction of a factory which would produce a superphosphate with 45-percent phosphoric acid content, such as is manufactured in the USSR.

Hungary's annual fertilizer need may be estimated at 5,100 carloads of water-soluble phosphoric acid. Transportation of this amount of 17-percent superphosphate, presently in use, requires 20,000 15-ton railroad cars which, in terms of the 2,000-ton railroad competition movement would require 150 locomotives and 6 million 50-kilogram sacks. Transportation of the same quantity of 45-percent double superphosphate would require 7,550 15-ton railroad cars, 56 locomotives, and 2,264,000 sacks. The cost of 1,133,000 quintals of the new fertilizer would be less than that of the 2 million quintals required at present.

In addition to these larger costs, there are many smaller items by which the cost of cultivation of sugar beets and of cultivation in general may be considerably reduced. To the general economy, this would mean a saving of the one-way turnaround time of the 12,450 15-ton railroad cars and 94 locomotives, 3,736,000 sacks, and 374,000 fertilizer-applying days.

Another artificial fertilizer containing phosphoric acid is Thomas slag, a by-product of the steel industry, where it occurs as an impurity in iron ore. However, this substance has never been processed for use as a fertilizer in Hungary and is not being used now. Thomas slag is a free source of the active ingredient of an artificial fertilizer containing 18-22 percent phosphoric acid.

Experiments using Thomas slag as an artificial fertilizer did not produce satisfactory results, however, because the slag was not soluble in water and did not react properly.

Pryanishnikov did what German, Swedish, English and US researchers could not do. He established that the phosphorus in Thomas slag could not be transformed into a water-soluble phosphoric acid, but spread on the soil as a fine powder, the phosphoric acid could be dissolved by the chemical action of bacteria and of the soil and utilized by plants.

Thomas powder is an artificial fertilizer, prepared from Thomas slag, which is available free of charge, consists of 50 percent lime, a soil restorative, and crumbles the humus layer. Thus, two important substances are supplied to the plants with one operation and at low expense.

Thomas phosphate has not been produced by Hungarian iron and steel factories because, due to the small capacity of foundries, production of the fertilizer was not profitable. However, since steel production is to be increased 2½ times under the Five-Year Plan, manufacture of this very cheap artificial fertilizer must be taken into consideration, and the production of Thomas phosphate made to correspond to the further increase in steel production prescribed in future Five-Year Plans.

With the exception of nitrosulfates, the author considers the greatest shortcoming in the manufacture of artificial fertilizers to be the lack of sufficient nitrogenous artificial fertilizers for the basis of soil fertilization. The production of nitrosulfates is dependent upon the manufacture of coke. The present output satisfies 10 percent of the need, and cannot be increased by technical means. Although the production of nitrosulfates will be increased by the further development of industry, through an increase in the manufacture of coke, the amount produced still will be slight, compared to the increased needs of agriculture. Therefore, nitrosulfates must be manufactured by other means. Nitrosulfates could be produced from peat, as from coal, but Hungary's peat bogs are not sufficiently extensive to merit their use for the above purpose.

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A nitrogenous artificial fertilizer must be manufactured, the basic ingredient of which is available domestically in unlimited supply and at low cost, is quick acting, and which, unlike present nitrogenous fertilizers, will not cause the soil to harden and crack.

Lime-nitrogen is such a fertilizer, the preparation of which requires only coal, lime, and air. Lime-nitrogen has all the desirable qualities of a good nitrogenous artificial fertilizer described above, and, in addition to 20-22 percent nitrogen, contains 40-45 percent lime. Lime-nitrogen added to the soil 2 weeks before planting leaves the soil soft and favorable to tuber and seed growth, and is exceptionally effective against rust and collapsing of stalk plants.

German technical writers have stated that lime-nitrogen in the soil kills off larvae, wire worms, cut worm moths and guinea worms. Although he has observed and studied the exterminating action of lime-nitrogen for a period of 15 years, the author cannot conclude that it exterminates or reduces the number of pests in the soil. Experiments have, however, indicated that beets grown in soil which has been treated with lime-nitrogen for long periods of time, lacked excessive foliage. This advantage of lime-nitrogen should not be underrated.

Nitrogenated lime of the same efficacy as lime-nitrogen may be prepared from coal, lime, and atmospheric nitrogen. The only difference between the two is that the former contains 6 percent calcium chloride.

The additional nitrogen requirements of plants is best fulfilled by petiso, or /domestic/ saltpeter, which is relatively cheap and available in sufficient quantities for agricultural use. Experience has shown that saltpeter is effective only when there is sufficient moisture in the soil for the development of the beets. After the beets have sprouted, saltpeter sould be added only when precipitation is suitable. Petiso is exceptionally advantageous for this purpose, since it has all the properties of Chilean saltpeter, with the additional advantage that it is a domestic product.

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